

Amplifier

70FA630/00R/05R

70FA650/00R/05R

Service
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Service Manual

FA630/00R/05R
FA650/00R/05R

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(GB)

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

(NL)

Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde worden toegepast.

(F)

Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.

(D)

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Geräts darf nicht verändert werden für Reparaturen sind Original-Ersatzteile zu verwenden.

(I)

Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati pezzi di ricambio identici a quelli specificati.

Documentation Technique Service Dokumentation Documentazione di Servizio Huolto-Ohje Manual de Servicio Manual de Servicio



"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

(GB) (NL) (F)

Subject to modification

4822 725 22431 (D) (I)

Printed in The Netherlands

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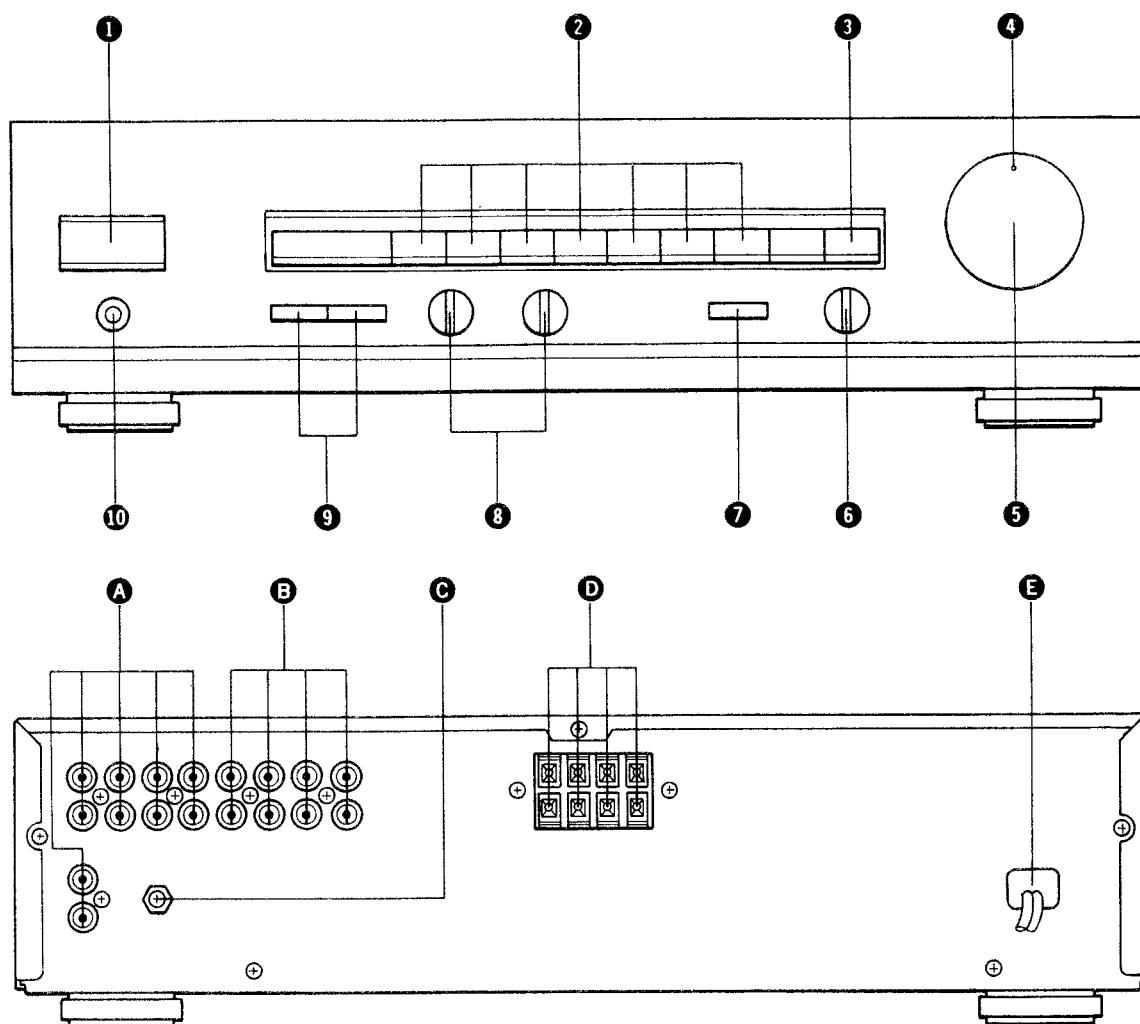
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SPECIFICATION

General		Nominal value	Typical value
Mains voltage		: 220V ~ (/00R) : 240V ~ (/05R)	: 220V ~ (/00R) : 240V ~ (/05R)
Mains frequency		: 50 — 60 Hz	: 50 — 60 Hz
Power consumption	FA630/FA650	: 140W/200W	: 140W/200W
Dimensions (WxHxD)		: 420 x 100 x 260 mm	: 420 x 100 x 260 mm
Weight	FA630/FA650	: 4.9 kg/6.0 kg	: 4.9 kg/6.0 kg
Amplifier			
Output power	FA630/FA650	: 27W/44W in 8Ω (IEC)	: 29W/48W in 8Ω (IEC)
Distortion	(FA630: 25W output) (FA650: 40W output)		
T.H.D.		: ≤ 0.05% at 1 kHz : ≤ 0.05% at 63 Hz — 12.5 kHz : ≤ 0.05% at 60/7000 Hz 4:1	: ≤ 0.008% at 1 kHz : ≤ 0.035% at 65 Hz — 12.5 kHz : ≤ 0.03% at 60/7000 Hz 4:1
Intermodulation			
Frequency characteristic			
Phono input	tone control	: from 20 Hz — 20 kHz ±1 dB (IEC)	: from 20 Hz — 20 kHz ±0.5 dB (IEC)
Other inputs	neutral	: from 20 Hz — 30 kHz ±1 dB	: from 15 Hz — 45 kHz ±1 dB
Bass control		: at 63 Hz +10 dB to -10 dB ±2 dB	: at 63 Hz +10 dB to -10 dB
Treble control		: at 12.5 kHz +10 dB to -10 dB ±2 dB	: at 12.5 kHz +10 dB to -10 dB
Loudness		: at 100 Hz +6 dB ±2 dB Tap : at 10 kHz +4 dB ±1.5 dB position	: at 100 Hz +6 dB Tap : at 10 kHz +4 dB position
Signal/noise ratio			
weighted (A-curve)			
Phono input (5 mV input)	FA630	: for 25W output ≥ 72 dB	: for 25W output ≥ 76 dB
	FA650	: for 40W output ≥ 76 dB	: for 40W output ≥ 80 dB
Other inputs (500 mV input)	FA630	: for 25W output ≥ 90 dB	: for 25W output ≥ 96 dB
	FA650	: for 40W output ≥ 92 dB	: for 40W output ≥ 96 dB
Channel separation		: at 1000 Hz ≥ 56 dB : at 250 Hz — 10 kHz ≥ 40 dB	: at 1000 Hz ≥ 60 dB : at 250 Hz — 10 kHz ≥ 45 dB
Input sensitivity/Input impedance			
Audio			
Phono		: 2.6 mV ± 0.3 mV/47 kΩ ± 5 kΩ	: 2.6 mV/47 kΩ
Other inputs		: 150 mV ± 20 mV/≥ 30 kΩ	: 150 mV/40 kΩ
Output level/Output impedance			
Tape 1, 2		: 250 mV/270Ω (Phono 5.0 mV 1 kHz input)	: 280 mV/270Ω (Phono 5.0 mV 1 kHz input)



CONNECTIONS AND CONTROLS

1	Mains switch	S901	A	Input	J401, JV01, JV02
2	Function switch (Aux switch: only for FA650)	SS01		(Aux input: only for FA650)	
3	Loudness switch	SG01	B	Tape input/output	JJ01, JJ02
4	Volume/Power indicator	DY51	C	Ground terminal	J031
5	Volume control	RG51	D	LS output A/B	JW01
6	Balance control	RE25	E	Mains cord	W001
7	Source direct switch	SE01			
8	Tone control	RE23, RE24			
9	LS switch	S701			
10	Phones socket	JW51			

(GB) Mains voltage changeover method

To make the unit usable with the other local mains voltage than the factory setting, modify the lead wire connection on the primary side of the power transformer as follows.

1. With units of the /00R version, the rated voltage is 220V.
To change the mains voltage for the unit to the same 240V as the /05R version, exchange the connections of the White and Red lead wires.
2. With units of the /05R version, the rated voltage is 240V.
To change the mains voltage for the unit to the same 220V as the /00R version, exchange the connections of the Red and White lead wires.
3. If the unit has already experienced the voltage changeover of 1 or 2 above, confirm which of the Red (240V) or White (220V) lead wires is connected to the fuse (F901) before attempting to change the connections.

(F) Méthode de changement de la tension

Pour rendre l'appareil utilisable sur une autre tension secteur locale que celle réglée en usine, modifier la connexion du fil conducteur sur le côté primaire du transformateur d'alimentation comme suit.

1. Sur les appareils de la version /00R, la tension nominale est de 220V.
Pour changer la tension secteur de l'appareil sur les 240V comme pour la version /05R, changer les connexions des fils conducteurs blanc et rouge.
2. Sur les appareils de la version /05R, la tension nominale est de 240V.
Pour changer la tension secteur de l'appareil sur les 220V comme pour la version /00R, changer les connexions des fils conducteurs rouge et blanc.
3. Si l'appareil a déjà subi le changement de tension de 1 ou 2 ci-dessus, vérifier le fil conducteur, rouge (240V) ou blanc (220V), raccordé au fusible (F901) avant de tenter de changer les connexions.

(NL) Methode voor instellen op de netspanning

Verander de aansluiting van de draden op de primaire kant van de transformator als volgt om het toestel geschikt te maken voor werking op een andere netspanning dan die waarop het toestel bij levering op ingesteld staat.

1. Bij toestellen van de /00R versie, is de nominale spanning 220V.
Verwissel de aansluiting van de witte en rode draden om het toestel aan te passen voor 240V zoals de toestellen van de /05R versie.
2. Bij toestellen van de /05R versie, is de nominale spanning 240V.
Verwissel de aansluiting van de rode en witte draden om het toestel aan te passen voor 220V zoals de toestellen van de /00R versie.
3. Als het toestel reeds eenmaal aangepast is volgens bovenstaande procedure 1 of 2, controleer dan of de rode (240V) of witte (220V) draad aangesloten is op de zekering (F901) alvorens de aansluiting om te wisselen.

(D) Methode zum Umstellen der Netzspannung

Zur Verwendung dieses Gerätes mit anderen Netzspannungen als der ab Werk eingestellten, müssen die Kabelanschlüsse an der Primärseite des Netztransformators wie folgt verändert werden.

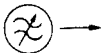





1. Bei Geräten der Version /00R ist die Nennspannung 220V.
Zum Umstellen der Netzspannung des Gerätes auf 220V wie bei der Version /05R müssen die Anschlüsse des weißen und des roten Kabels ausgetauscht werden.
2. Bei Geräten der Version /05R ist die Nennspannung 240V.
Zum Umstellen der Netzspannung des Gerätes auf 240V wie bei der Version /00R müssen die Anschlüsse des roten und des weißen Kabels ausgetauscht werden.
3. Falls beim Gerät bereits die unter 1 oder 2 beschriebene Spannungsumstellung durchgeführt wurde, muß festgestellt werden, ob das rote Kabel (240V) oder das weiße Kabel (220V) mit der Sicherung (F901) verbunden ist, bevor die Anschlüsse vertauscht werden.

(I) Metodo di regolazione del voltaggio di rete

Per poter utilizzare l'unità con voltaggi di rete diversi da quello previsto in fabbrica, modificate il collegamento dei fili sul lato primario del trasformatore di potenza nel modo che segue.

1. Per le unità della versione /00R, il voltaggio normale è di 220V.
Per cambiare il voltaggio dell'unità ai 240V della versione /05R, cambiate le posizioni dei fili bianco e rosso.
2. Per le unità della versione /05R, il voltaggio normale è di 240V.
Per cambiare il voltaggio dell'unità ai 220V della versione /00R, cambiate le posizioni dei fili rosso e bianco.
3. Se il voltaggio dell'unità è stato già cambiato come visto ai punti 1 o 2, controllate quale dei due fili rosso (240V) o bianco (220V) è collegato al fusibile (F901) prima di cambiare i collegamenti.

Idling Current

SK... SWITCH	 SIGNAL	 TO	 VOLUME	 ADJUST	 OSCILLOSCOPE	 D.C. METER INDICATOR
			Min.	Rch R718		Rch TP2(+), TP4(-) DC2.5mV (6.9mA)
				Lch R717		Lch TP1(+), TP3(-) DC2.5mV (6.9mA)

GB Notes:

- 1 minute after the power has been switched ON, adjust to read 2.5 mV DC.
- If the heat-sink temperature is higher than the ambient temperature, switch the power OFF, and leave the unit until the heat-sink temperature falls equal to or below the ambient temperature before proceeding to the idling current adjustment.
- For the idling current adjustment, adjust the R channel first, then the L channel.

F Remarques:

- 1 minute après avoir fourni l'alimentation, ajuster pour lire 2,5 mV CC.
- Si la température de la plaque de refroidissement est supérieure à la température ambiante, couper l'alimentation et laisser l'appareil jusqu'à ce que la température de la plaque de refroidissement soit égale ou inférieure à la température ambiante avant de passer à l'ajustement du courant dévatté.
- Pour le réglage de la puissance réactive, ajuster le canal R (droit) en premier lieu, puis le canal L (gauche).

NL Opmerkingen:

- Maak de instelling zodanig dat 2,5 mV gelijkstroom aangegeven wordt na 1 minuut nadat de spanning ingeschakeld wordt.
- Als de temperatuur van de warmteput hoger is dan de omringende temperatuur, schakel dan de spanning uit totdat de temperatuur van de warmteput gelijk is aan of lager is dan de omringende temperatuur alvorens over te gaan tot aanpassen op de stationaire stroom.
- Bij het afstellen van de blinde stroom moet eerst het R-kanaal worden afgesteld en daarna het L-kanaal.

D Anmerkungen:

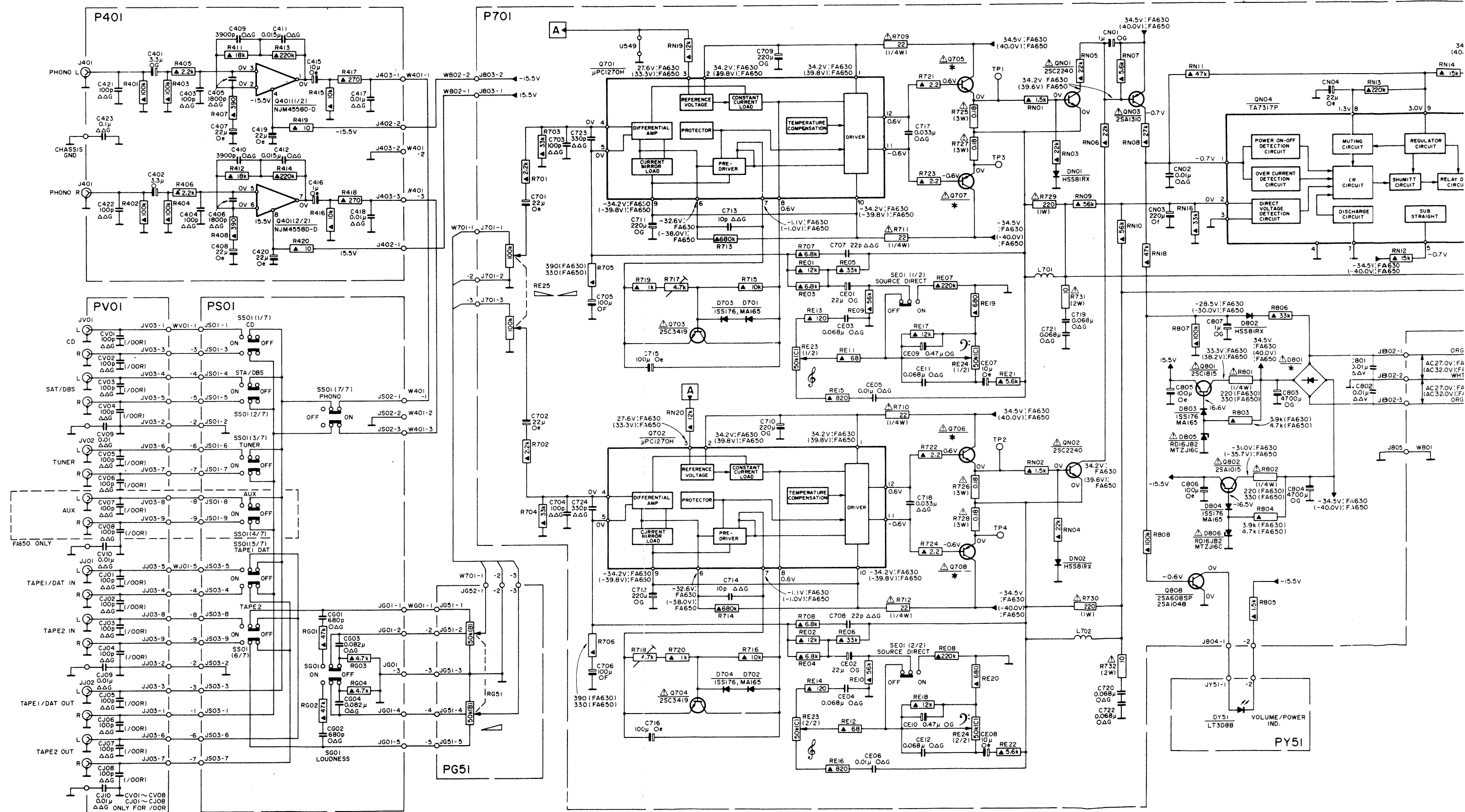
- 1 Minute nach Einschalten der Spannungsversorgung so einstellen, daß 2,5 mV Gleichstrom angezeigt wird.
- Wenn die Temperatur des Kühlkörpers höher ist als die Umgebungstemperatur, die Spannungsversorgung ausschalten und warten, bis die Temperatur des Kühlkörpers gleich der oder niedriger als die Umgebungstemperatur wird, bevor die Ruhestrom-Einstellung durchgeführt wird.
- Für die Ruhestrom-Einstellung zuerst den rechten und dann den linken Kanal einstellen.

I Note:

- Fate in modo da ottenere un valore di 2,5 mV di c.c. un minuto dopo l'accensione.
- Se la temperatura degli organi di dispersione del calore è superiore a quella dell'ambiente, spegnete l'unità e lasciatela raffreddare sino a che la sua temperatura non diviene uguale o inferiore a quella ambiente, quindi procedete con la regolazione della corrente a riposo.
- Per la regolazione della corrente reattiva, regolare prima il canale destro R e quindi il canale sinistro L.

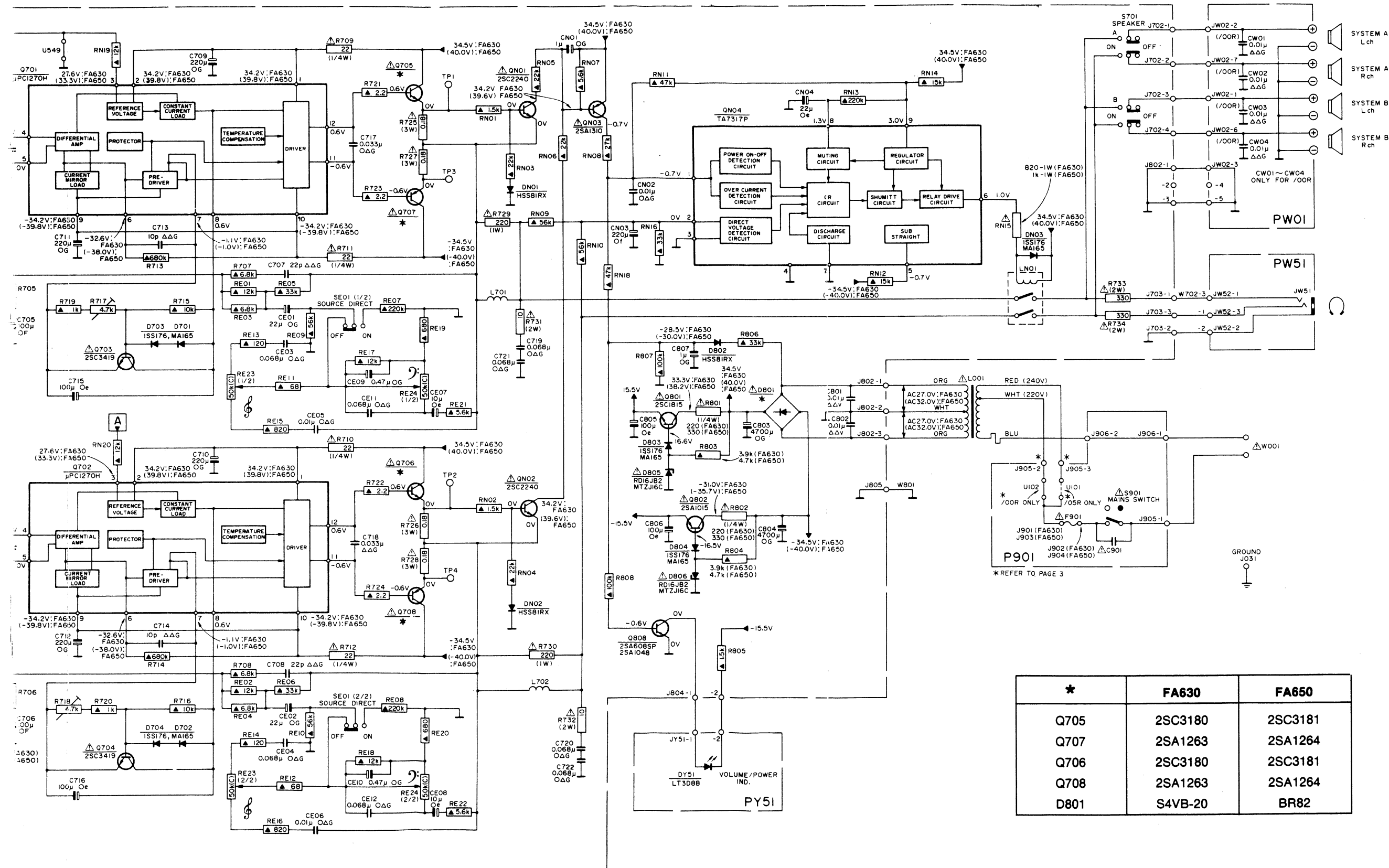
SCHEMATIC DIAGRAM(FA630/FA650)

R	R401~R406		R407	R408	R411~R414		R415~R420		R701~R706		R717~R720		RN19	RN20	R713~R716		R707	RE01~RE06		R709~R712		R721~R728		RN01~RN04		RN05~RN10		RN16	RN11	RN12~RN14												
	RG01~RG04										RG51	RE25	C701~C706		C723	C711	C715	C713	C709	R708	RE23	RE09~RE16	RE17	RE18	RE07	RE08	RE24	RE19~RE22	R729~R732		R808		R807	R801~R806								
C	C421~C423		C401~C404		C405~C410		C419	C420	C411	C412		C415~C418		C701~C706		C723	C711	C715	C713	C709	C707	CE01~CE06	C717	C718	CE07~CE12	C719~C722		CN01		CN02	CN03	CN04										
	CV01~CV10		CJ01~CJ10		CG01~CG04										C724	C712	C716	C714	C710	C708	C718	CE07~CE12	C719~C722		C805~C807		C803	C804	CH01	C802												
Q - D	Q401										Q701										Q702	Q703	Q704	D701~D704		Q705~Q708		DN01	DN02	QN01~QN03	Q808	Q801	D803~D806	Q802	D802	DY51	QN04	D80				
S - L - F	SS01										SG01										SE01										L701										L702	



SCHEMATIC DIAGRAM(FA630/FA650)

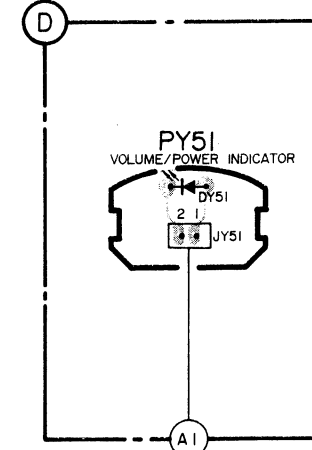
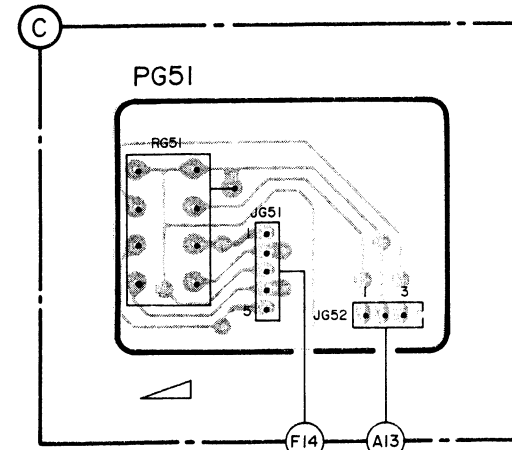
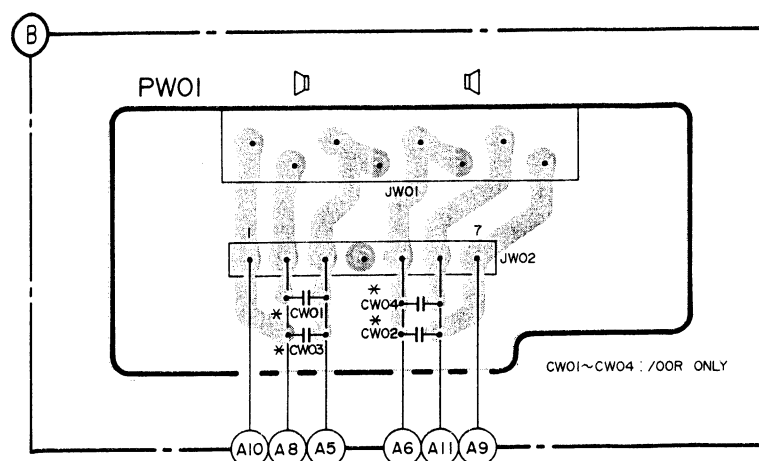
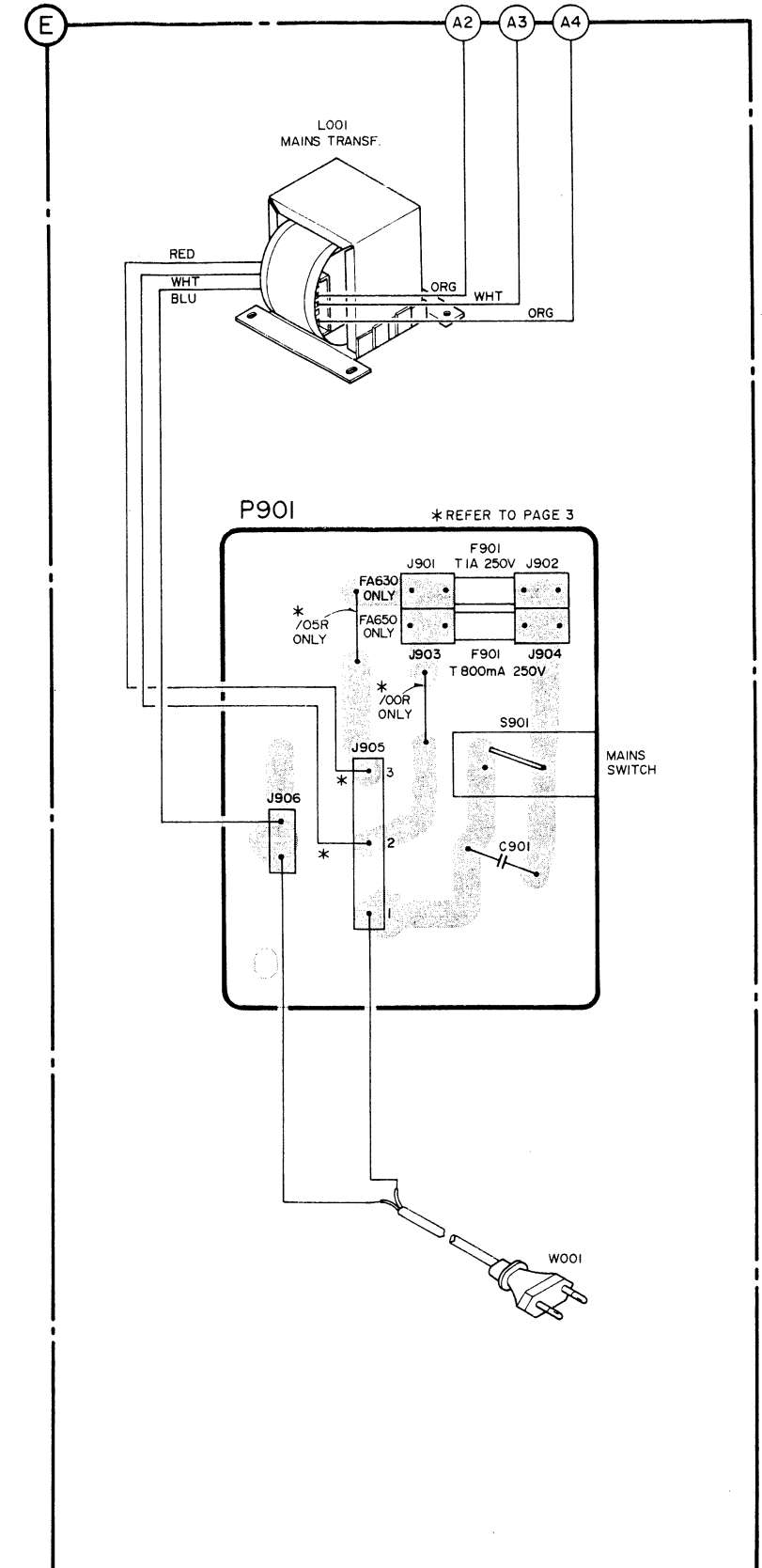
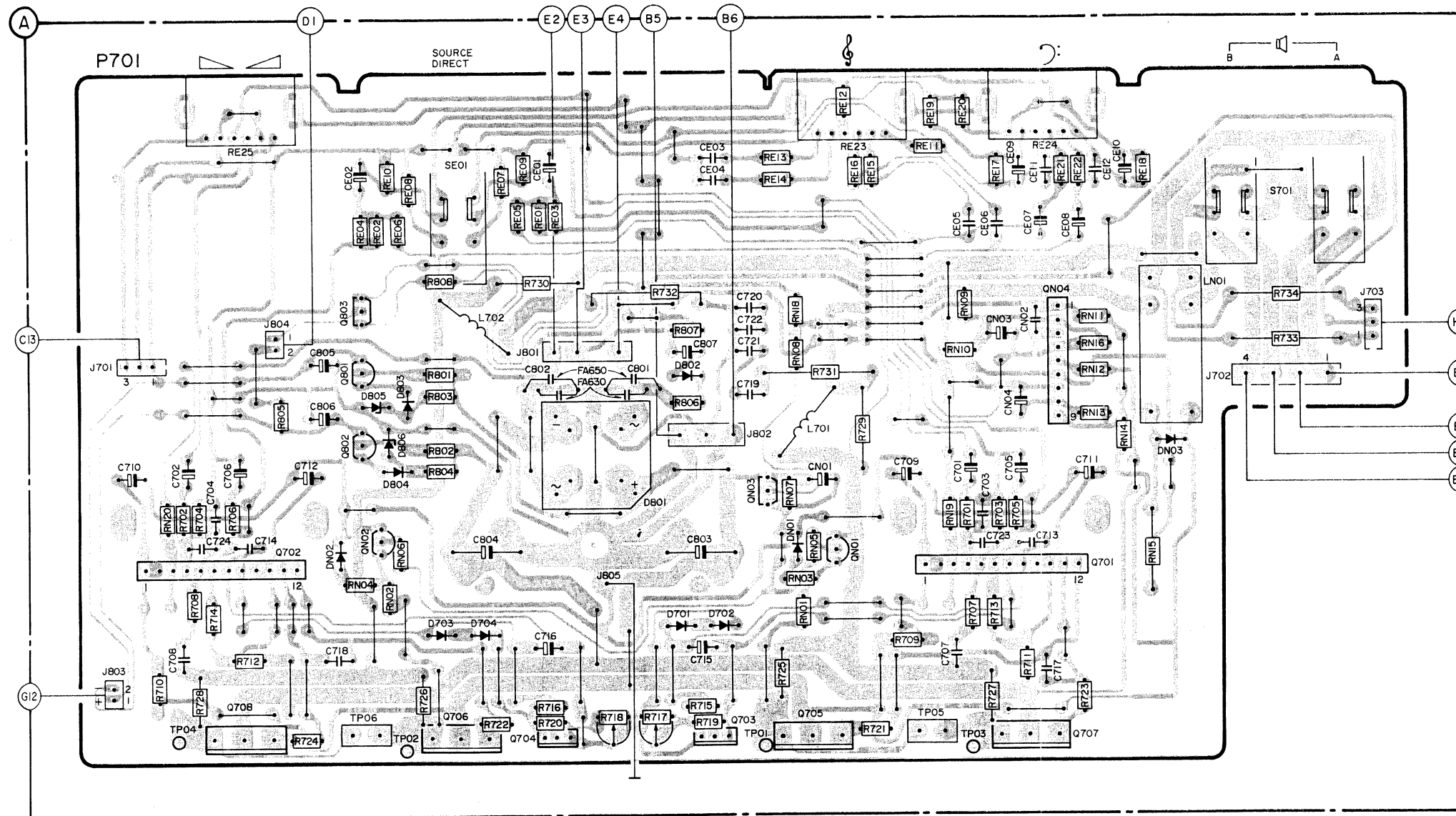
R717~R720 RN19 RN20 R713~R716	R707 RE01~RE06 R709~R712 R721~R728	RN01~RN04 RN05~RN10 RN18 RN16 RN11	RN12~RN14	RN15	R733 R734	R
C711 C715 C713 C709	R708 RE23 RE09~RE16 RE17 RE18 RE07 RE08 RE24 RE19~RE22 R729~R732	R808 R807 R801~R806	CN01 CN02 CN03	CN04	CW01~CW04	C
C712 C716 C714 C710	C707 CE01~CE06 C717 C708	C718 CE07~CE12	C719~C722	C805~C807 C803 C804	C801 C802	Q-D
Q701 Q702 Q703 Q704 D701~D704	SE01 Q705~Q708	DN01 DN02 DN01~DN03	Q808 Q801 D803~D806 Q802 D802 DY51 QN04 D80	DN03	F901 S901 S701	S-L-F
	SE01	L701 L702		L001 LN01		



*	FA630	FA650
Q705	2SC3180	2SC3181
Q707	2SA1263	2SA1264
Q706	2SC3180	2SC3181
Q708	2SA1263	2SA1264
D801	S4VB-20	BR82

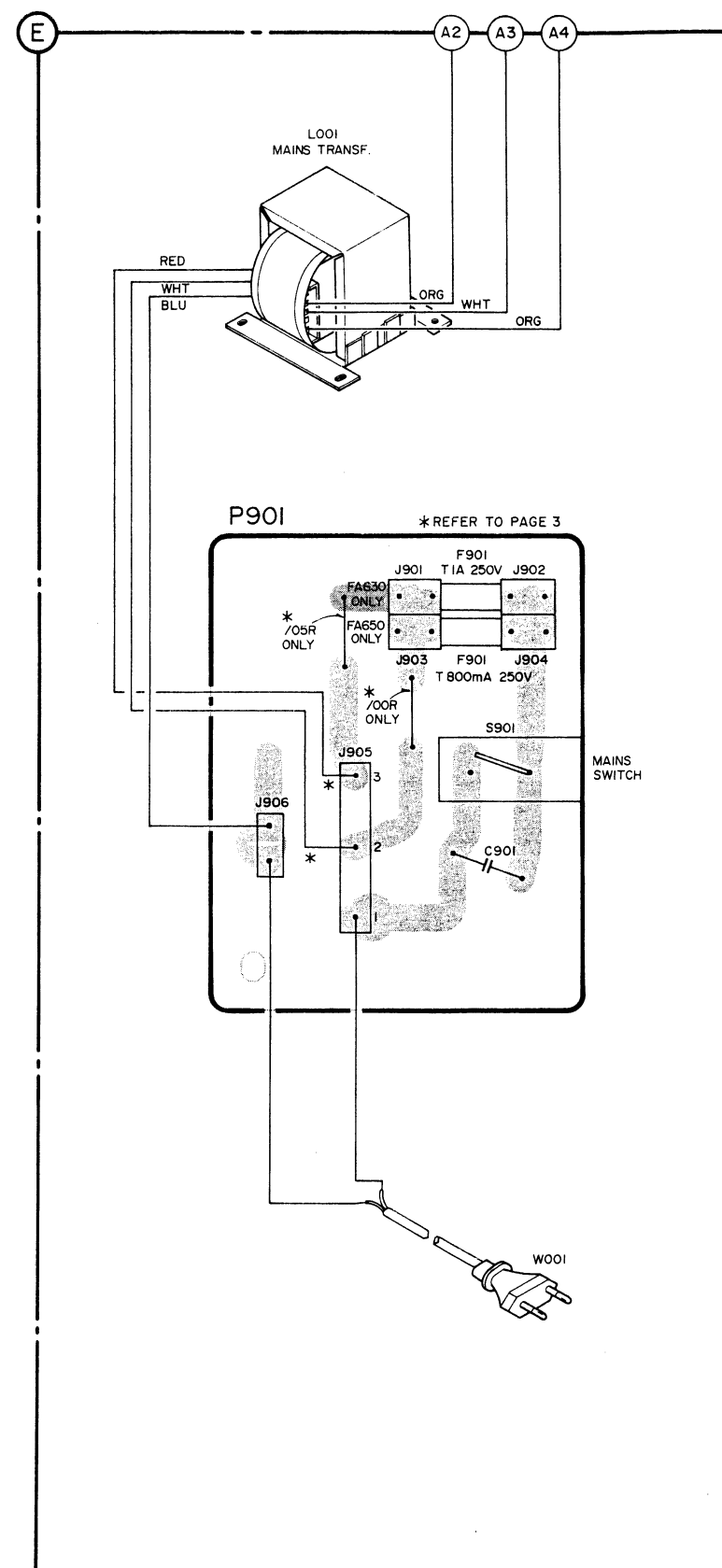
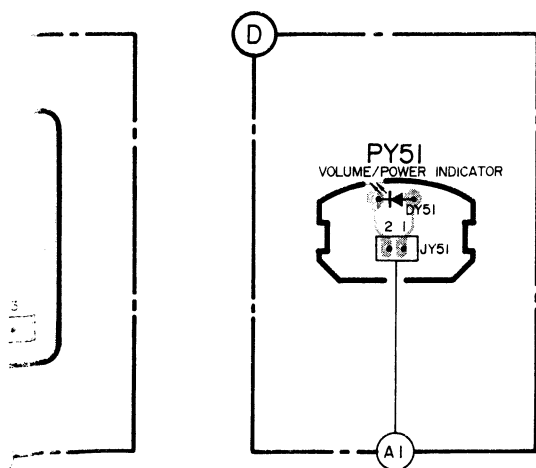
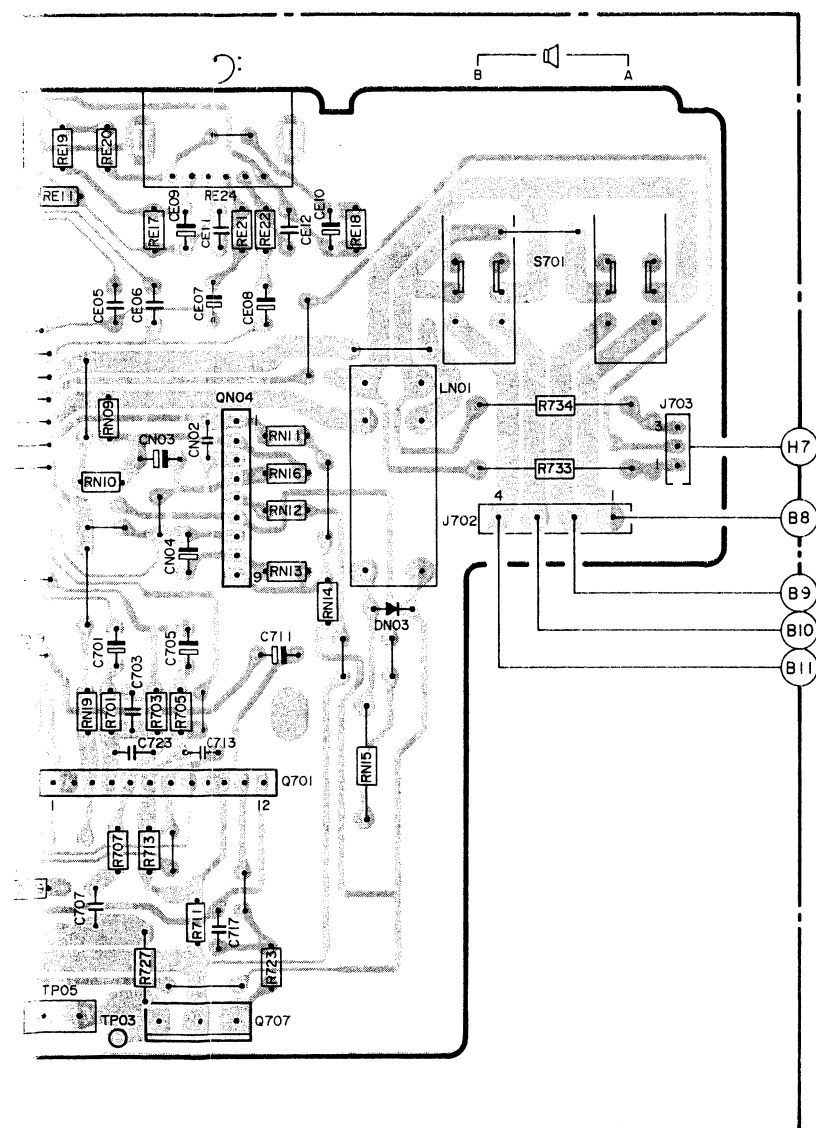
R	RN20R702R704R706RE25R805	RE04RE02RE0RE06RE08R808RE07RE05RE09RE01RE03R730	RN18RN08RE12~RE16RE23R731RE11RE19RE20RN09RN0RE17RE24RE21RE22RE18RN11~RN16	R733R734	R
C	C710	C702C724C704C706C714	C712C805C806CE02	CE01C802	C
Q	Q708	Q702	Q706	Q704	Q
D	DN02	D803~D806	D703	D704	D
F-L-S	SE01	L702	D801	D802D701D702	F-L-S

COMPONENT SIDE VIEW

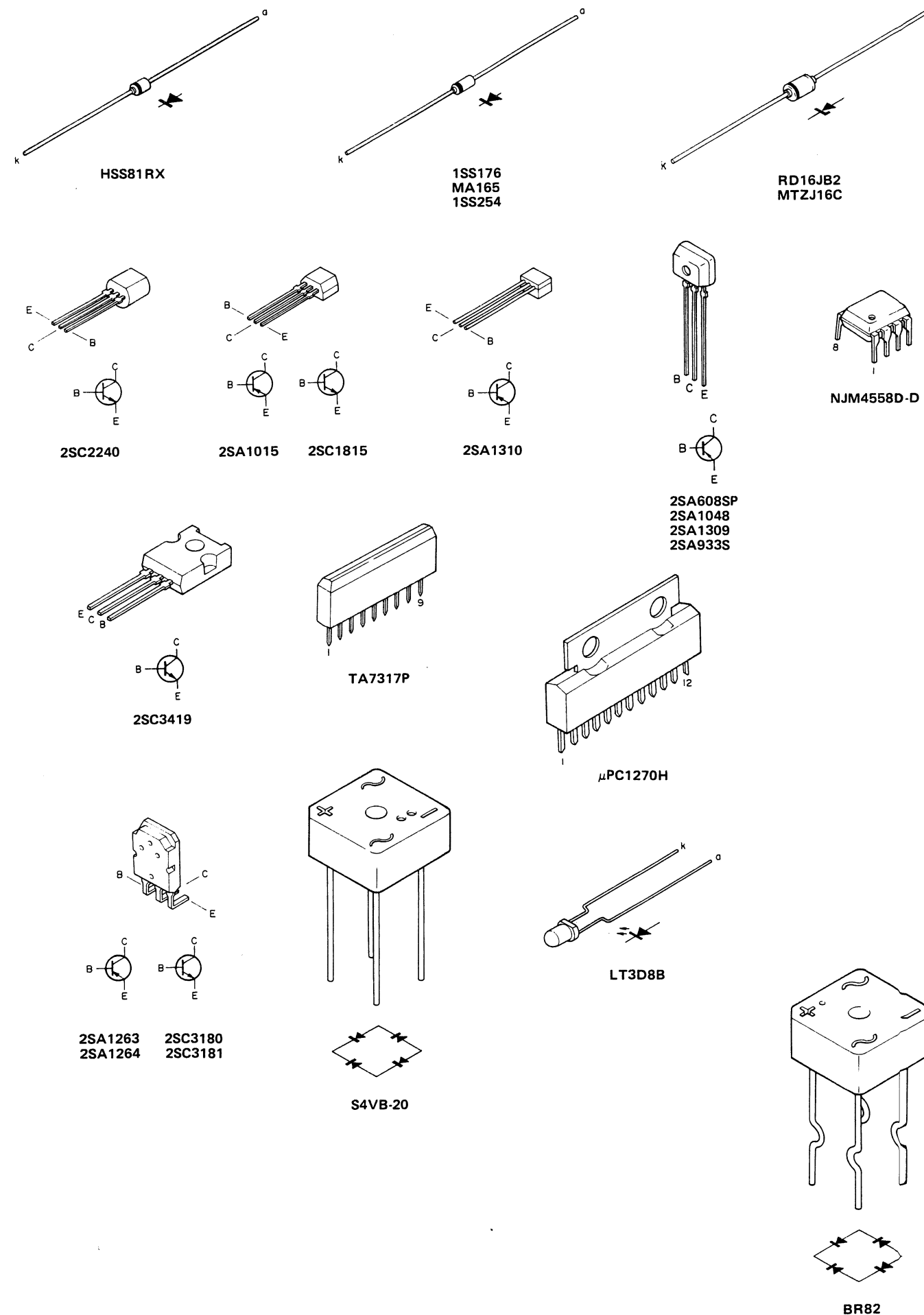


20RN09RNIORE17RE24RE21RE22RE1BRN11~RN16	R733R734		R
709RN19R701R707R703R705R713R727R711R723			C
CN02~CN04CE05~CE12			
709C707C701C723C703C705C713C717C711		C901	
QN04			Q
Q707Q701			D
DN03DY51			
LN01	S701	L001	F901S901
			F-L-

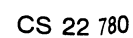
VIEW



Semiconductor Layout

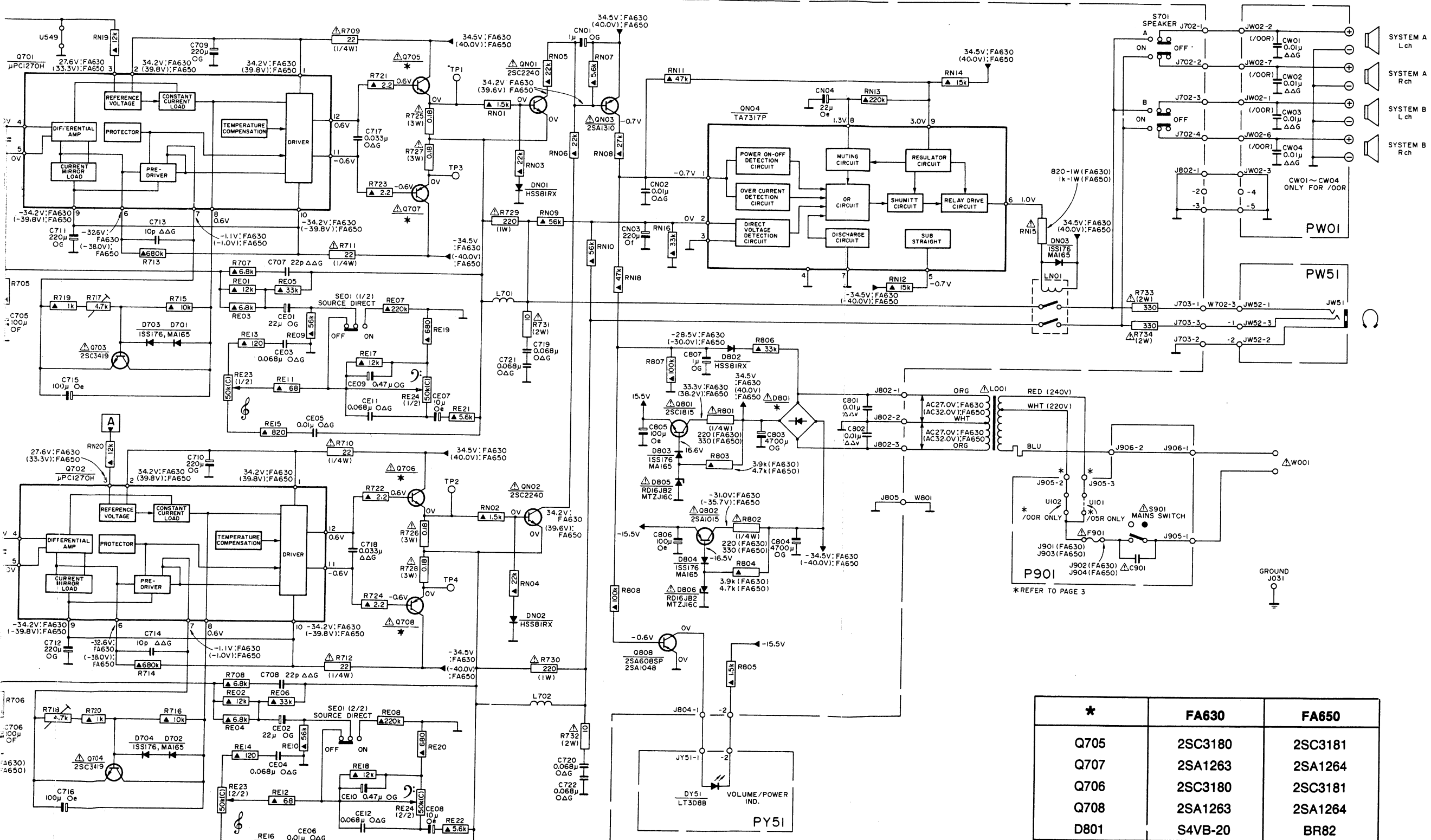


R	R401~R406	R407	R408	R411~R414	R415~R420	R701~R706	R717~R720	RN19	RN20	R713~R716	R707	REG1~REG6	R709~R712	R721~R728	RN01~RN04	RN05~RN10	RN18	RN16	RN11	RN12~RN14											
						RG01~RG04		RG51	RE25			R708	RE23	RE09~RE16	RE17	RE18	RE07	RE08	RE24	RE19~RE22	R729~R732	R808	R807	R801~R806							
C	C421~C423	C401~C404	C405~C410	C419	C420	C411	C412	C415~C418		C701~C706	C723	C711	C715	C713	C709	C707	CE01~CE06	C717			CN01	CN02	CN03	CN04							
	CV01~CV10	CJ01~CJ10				CG01~CG04				C724		C712	C716	C714	C710	C708		C718	CE07~CE12		C719~C722	C805~C807	C803	C804	C801	C802					
Q-D				Q401						Q701	Q702	Q703	Q704	D701~D704					Q705~Q708		DN01	DN02	QN01~QN03	Q808	Q801	D803~D806	Q802	D802	DY51	QN04	D801
S-L-F				SS01		SG01											SE01				L701	L702									



SCHEMATIC DIAGRAM(FA630/FA650)

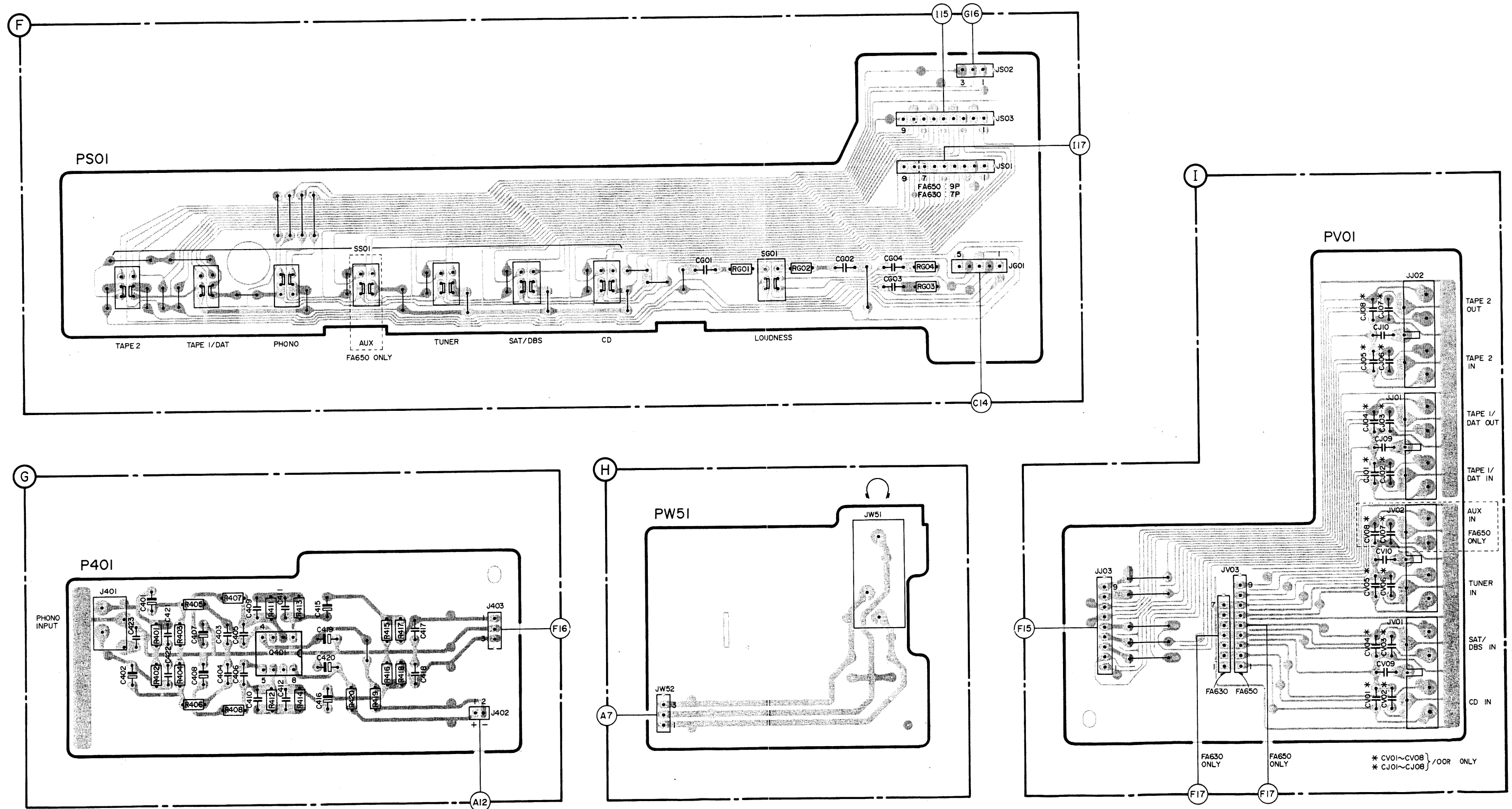
R717~R720 RN19 RN20 R713~R716										R707 RE01~RE06 R709~R712 R721~R728										RN01~RN04 RN05~RN10 RN18 RN11										RN12~RN14 RN15 R733 R734										R
C711 C715 C713 C709										R708 RE23 RE09~RE16 RE17 RE18 RE07 RE08 RE24 RE19~RE22										RN01~RN04 RN05~RN10 RN18 RN11										RN12~RN14 RN15 R733 R734										C
C712 C716 C714 C710										C707 CE01~CE06 C717 C718 CE07~CE12										C719~C722 C805~C807 C803 C804 C801 C802										C901 CW01~CW04										.
Q701 Q702 Q703 Q704 D701~D704										Q705~Q708 DN01 DN02 QN01~QN03 Q808 Q801 D803~D806 Q802 D802 DY51 QN04 D801										Q808 Q801 D803~D806 Q802 D802 DY51 QN04 D801										C901										Q-D
SE01										L701 L702										L701 L702										DN03										S-L-F
																														L001 LN01 F901 S901 ST01										

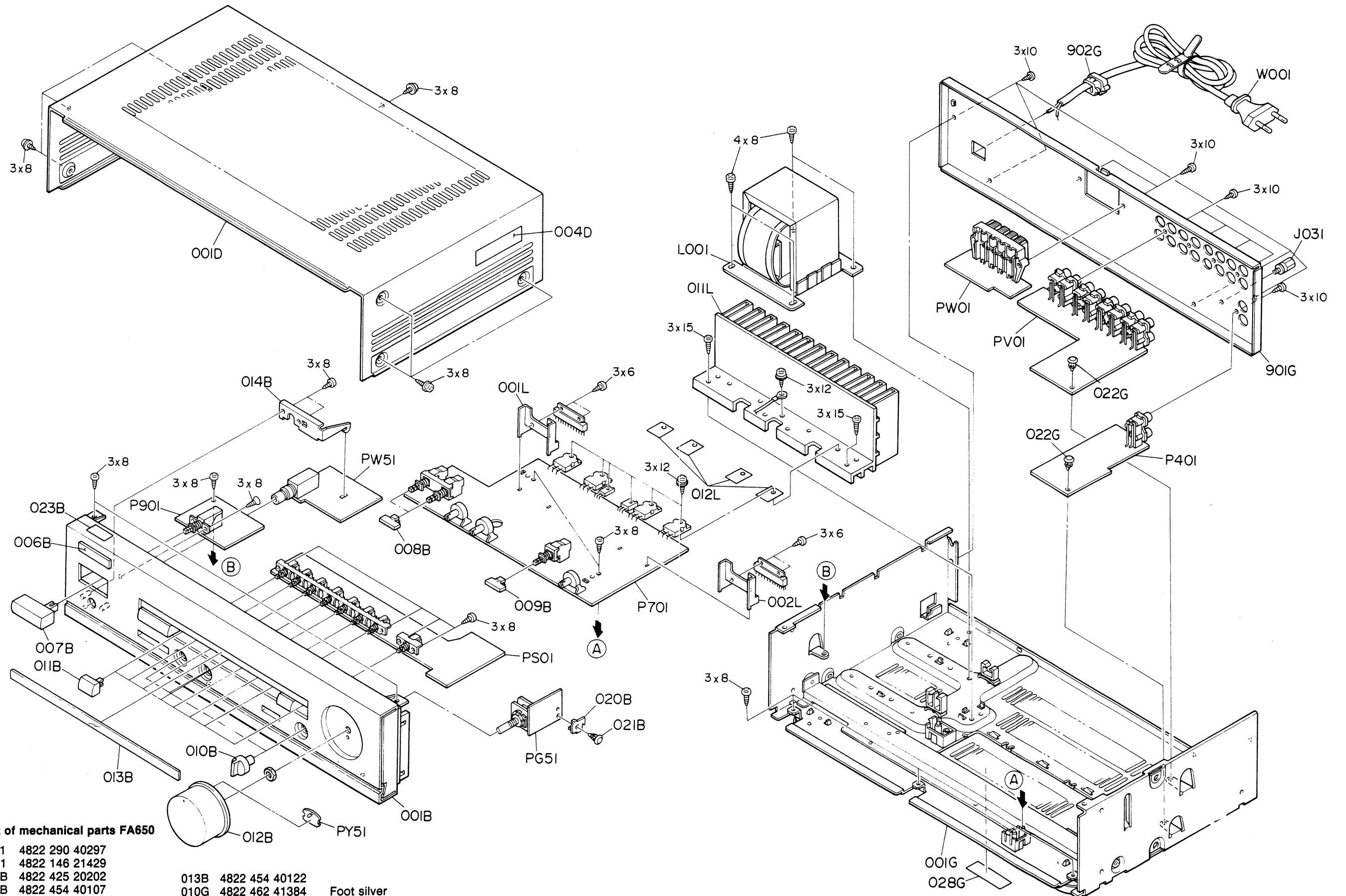


WIRING DIAGRAM(FA630/FA650)

R	R401~R406	R407 R408 R411~R414	R415~R420	RG01	RG02	RG03 RG04	CJ01~CJ10 CV01~CV10	R
C	C402 C401C421~C423	C403~C408 C409~C412	C415C416C419C420 C417 C418	CG01		CG02~CG04		C
Q		Q401			SG01			Q
S		SS01						S

COMPONENT SIDE VIEW





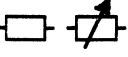
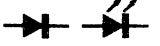



List of mechanical parts FA650

J031	4822 290 40297	
L001	4822 146 21429	
001B	4822 425 20202	
006B	4822 454 40107	
007B	4822 410 60143	
008B	4822 410 60144	
009B	4822 410 60144	
010B	4822 413 41523	
011B	4822 410 60145	
012B	4822 413 41522	
013B	4822 454 40122	
010G	4822 462 41384	Foot silver
011G	4822 462 41385	Foot black
902G	4822 532 60948	

Remark:
Only the parts provided with a service codenumber are available as service spare parts.

LIST OF ELECTRICAL PARTS FA630, FA650

 <p>C705 4822 124 22271 Cap. electr. 100 μF 35V C706 4822 124 22271 Cap. electr. 100 μF 35V C803 4822 124 21977 Cap. electr. 4700 μF 50V C804 4822 124 21977 Cap. electr. 4700 μF 50V C901 4822 122 33276 Cap. ceramic. 0.01 μF 400V</p>	 <p>4822 209 83779 μP 1270H 4822 209 83631 NJM4558D-D 4822 209 83312 TA7317P</p>
 <p>RE23 4822 101 30628 Potm. 50K X2 RE24 4822 101 30628 Potm. 50K X2 RE25 4822 101 30627 Potm. 100K X2 RG51 4822 101 30629 Potm. 50K X2 RN15 4822 116 55263 Safety res. 820 Ω 1W FA630 RN15 4822 116 63331 Safety res. 1K 1W FA650 R709 4822 116 60318 Res. fusible 22Ω 1/4W FA630 R709 4822 113 90119 Res. fuse 22Ω 1/4W FA650 R710 4822 116 60318 Res. fusible 22Ω 1/4W FA630 R710 4822 113 90119 Res. fuse 22Ω 1/4W FA650 R711 4822 116 60318 Res. fusible 22Ω 1/4W FA630 R711 4822 113 90119 Res. fuse 22Ω 1/4W FA650 R712 4822 116 60318 Res. fusible 22Ω 1/4W FA630 R712 4822 113 90119 Res. fuse 22Ω 1/4W FA650 R717 4822 100 11373 Potm. trimmer 4.7K R718 4822 100 11373 Potm. trimmer 4.7K R725 4822 116 80171 Res. safety 0.18Ω 3W R726 4822 116 80171 Res. safety 0.18Ω 3W R727 4822 116 80171 Res. safety 0.18Ω 3W R728 4822 116 80171 Res. safety 0.18Ω 3W R729 4822 116 60246 Res. safety 220Ω 1W R730 4822 116 60246 Res. safety 220Ω 1W R731 4822 111 90726 Res. safety 10Ω 2W R732 4822 111 90726 Res. safety 10Ω 2W R733 4822 116 60262 Res. safety 330Ω 2W R734 4822 116 60262 Res. safety 330Ω 2W R801 4822 113 90141 Res. fuse 220Ω 1/4W FA630 R801 4822 116 81748 Res. fuse 330Ω 1/4W FA650 R802 4822 113 90141 Res. fuse 220Ω 1/4W FA630 R802 4822 116 81748 Res. fuse 330Ω 1/4W FA650</p>	 <p>4822 130 81093 BR82 FA650 4822 130 80837 HSS81RX 4822 130 80326 LT3D8B red 4822 130 80498 RD16JB2, MTZJ16C 4822 130 31007 S4VB-20 FA630 4822 130 33305 1SS176,MA165,1SS254</p> <p>Miscellaneous</p> <p>F901 4822 253 30201 Fuse 1A 250V FA650 F901 4822 253 20168 Fuse 800mA 250V FA630 JJ01 4822 265 30397 Jack 4p JJ02 4822 265 30397 Jack 4p JV01 4822 265 30397 Jack 4p JV02 4822 267 30741 Jack 2p FA630 JV02 4822 265 30397 Jack 4p FA650 JW01 4822 267 50922 8p spk terminal JW51 4822 267 30617 Headphone jack J031 4822 290 40297 Ground terminal J401 4822 267 30741 2p RCA pin J901 4822 256 30329 Holder, fuse FA630 J902 4822 267 30978 Holder, fuse FA630 J903 4822 256 30329 Holder, fuse FA650 J904 4822 267 30978 Holder, fuse FA650 L001 4822 146 21428 Transf. mains FA630 L001 4822 146 21429 Transf. mains FA650 L701 4822 157 51739 Coil, choke L702 4822 157 51739 Coil, choke LN01 4822 280 70354 Relay 5A/240V AC SE01 4822 276 12595 Switch, pushbut. SG01 4822 276 12596 Switch, pushbut. SS01 4822 276 70107 Switch, pushbut. S701 4822 276 20477 Switch, pushbut. S901 4822 276 11898 Switch, pushbut.</p>
 <p>4822 130 42715 2SA608SP, 2SA1048, 2SA1309 4822 130 61666 2SC3419 O,Y 4822 130 42961 2SA1015 O,Y 4822 130 60694 2SA1263 R,O FA630 4822 130 43018 2SA1264 R,O FA650 4822 130 61665 2SA1310 R or S 4822 130 43197 2SC1815 O,Y 4822 130 43233 2SC2240 GR or BL 4822 130 60697 2SC3180 R,O FA630 4822 130 61319 2SC3181 R,O FA650</p>	